



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|-----------------------------|------------------|
| 10/550,506 | 09/23/2005 | Yizhou Song | P05,0328 | 9959 |
| 26574 | 7590 | 03/04/2009 | | |
| SCHIEF HARDIN, LLP PATENT DEPARTMENT 6600 SEARS TOWER CHICAGO, IL 60606-6473 | | | EXAMINER BAND, MICHAEL A | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 1795 | |
| | | | MAIL DATE | DELIVERY MODE |
| | | | 03/04/2009 PAPER | |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/550,506

Applicant(s)

SONG ET AL.

Examiner

MICHAEL BAND

Art Unit

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 November 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 6, 7 and 9-14 is/are pending in the application.
- 4a) Of the above claim(s) 9 and 10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 6, 7 and 11-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/S508)
Paper No(s)/Mail Date 11/18/2008
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claim 14 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 14 contains the limitation requiring reversing polarity between first and second sputtering electrodes so that the first electrode oscillates between being cathode and anode states, so that the second electrode has an anode state while the first electrode has a cathode state, and so that the second electrode has a cathode state while the first electrode has an anode state. There is no support in the Specification.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 6-7 and 11-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hartsough (US Patent No. 4,420,385) in view of Sproul et al (US Patent No. 5,789,071).

With respect to claims 6-7 and 11-14, Hartsough discloses a method for forming a thin film on a substrate [40] where a process chamber [24] has a sputter zone [62] and a chemically reaction zone [70] (abstract; figs. 1-2), where the sputtering is of a metal using an argon source [34] and the reaction zone [70] uses an oxygen source [31] (fig. 2; col. 2, lines 14-17). Hartsough further discloses sputtering the aluminum onto the substrate [40] in the sputtering zone [62], where said substrate [40] is then rotated into the reaction zone [70] so that the aluminum reacts with the oxygen to form a dielectric (i.e. compound) thin film of Al_2O_3 (col. 2, lines 29-36). Hartsough also discusses repeatedly exposing the substrate [40] to the sputtering zone [62] and reaction zone [70] until the dielectric Al_2O_3 film on said substrate [40] reaches a desired thickness (col. 4, lines 54-59). Fig. 5 depicts controlling the speed of a substrate table (i.e. holder) [26] in regards to material deposition, where fig. 1 depicts said substrate table [26] as cylindrical with the substrate [40] near an outer peripheral face. Fig. 2 also depicts a flow controller [30] for the oxygen source [31], with Hartsough stating that oxygen partial pressure is set (i.e. increased or decreased) in regards to the rotational speed of the substrate table [26] (col. 6, lines 47-68). Since the oxygen partial pressure is either increased or decreased via flow controller [30] based upon the substrate table [26] speed, the increase or decrease of an oxygen flow rate is therefore based upon the speed of said substrate table [26] as well. Hartsough is limited in that while a range is

given for oxygen partial pressure between 1×10^{-3} Torr (1 mTorr) and 7×10^{-5} Torr (0.07 mTorr), an associated oxygen flow rate is not suggested.

Sproul et al teaches multilayer oxide coatings, specifically of aluminum oxide (Al_2O_3) (col. 9, lines 42-49). Sproul et al further teaches the appropriate partial pressure of oxygen is selected from the hysteresis curve which relates to oxygen gas flow (col. 10, lines 54-57), with a Table on col. 11 depicting a partial oxygen pressure of 0.03 mTorr. Sproul et al also teaches that referring to fig. 5, when the optimal partial pressure of oxygen is in the range of 0.02 mTorr, the oxygen flow is in the range of 15 to 20 sccm (col. 8, lines 63-66). Sproul et al also teaches a target as a cathode and an adjacent anode controlled via controller (col. 7, lines 48-57).

It would have been obvious to one of ordinary skill in the art to use the oxygen flow rate of Sproul et al for the flow rate of Hartsough since Hartsough fails to specify a flow rate and one of ordinary skill would have a reasonable expectation of success in making the modification since Sproul et al has shown similar oxygen partial pressures as those of Hartsough in the sputtering of aluminum.

Response to Arguments

Claim Objections

5. Claim 10 has been amended to be dependent upon withdrawn claim 9. Therefore the objection is withdrawn, with claim 10 being withdrawn.

103 rejections

6. On p. 11-12, the Applicant argues that Sproul et al does not teach adjusting a film composition of a finally formed thin film so that the thin film has an optical characteristic value in a region where hysteresis phenomenon occurs, where the hysteresis phenomenon occurs in a range where the reactive gas introduced during sputtering has a flow rate of 15 sccm or less, which does not include 0 sccm.

The Examiner respectfully disagrees and submits the following from the rejection of claim 6: "Sproul et al further teaches the appropriate partial pressure of oxygen is selected from the hysteresis curve which relates to oxygen gas flow (col. 10, lines 54-57), with a Table on col. 11 depicting a partial oxygen pressure of 0.03 mTorr. Sproul et al also teaches that referring to fig. 5, when the optimal partial pressure of oxygen is in the range of 0.02 mTorr, the oxygen flow is in the range of 15 to 20 sccm (col. 8, lines 63-66)".

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Band whose telephone number is (571) 272-9815. The examiner can normally be reached on Mon-Fri, 8am-4pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

9. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. B./

Examiner, Art Unit 1795

/Alexa D. Neckel/

Supervisory Patent Examiner, Art Unit 1795